NAVY MEDICAL HISTORY NM NPRU SAN DIEGO DEC 1965

1965

U. S. NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT

SAN DIEGO, CALIFORNIA 92152

PROGRAM PROJECTION - 1966-1970

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Development

Designed as the Navy's primary research capability in the areas of psychiatry and neurology, with the associated disciplines of clinical psychology, psychophysiology, cultural anthropology, the Unit was placed in San Diego, so that it might be close to a variety of possible research populations and in an environment of naval research. A quick inventory of the variety of naval activities in San Diego shows two recruit training commands, both Navy and Marine Corps, making available at any time half of the recruits in training in both services; the largest Naval Hospital, with its multiplicity of services and its number of in- and outpatients; several air stations, including the principal one for helicopters, the largest jet base, and a comprehensive repair facility for aircraft; the headquarters of the First Fleet; the headquarters of the Fleet Training Command; the Amphibious Training Center; headquarters of the

Commander Cruiser Destroyer Force; the Fleet Anti-Submarine Warfare School; the Fleet Computer Programming School; a submarine flotilla; the training center and headquarters for underwater demolition; plus a large number of smaller activities. Within an hour's drive of the Unit is the largest Marine Corps Base. The Navy's principal research activity for personnel problems, the Chief of Naval Personnel's Personnel Research Laboratory is adjacent to our Unit. And demoninating the compound is the Navy's principal research capability in electronics; the Chief of the Bureau of Ships' Navy Electronics Laboratory.

The foresight shown in locating the Unit is manifested by the fact that research subjects from a good number of these activities were used during the first five years of the Unit's existence, especially the two recruit training centers, the hospital, and the other training activities.

The possibilities inherent in the propinquity to other Navy research and development activities and facilities are suggested by the working relationships with the nearby agencies. The principal working relationships with local commands include:

Navy Electronics Laboratory: This activity furnishes housing, personnel services, purchasing, some library, and access, on an eminently fair basis, to its highspeed computer. Moreover, since there is a portion of research in human factors involved in the Navy Electronics Laboratory programs, there is the possibility of cooperation between the psychologists in NEL and those in the Unit.

Human Factors in Medical Support Med Com. & Data.

Naval Personnel Research Laboratory: While Personnel Research Laboratory's principal tasks relate to personnel selection and training, are distinctly non-medical in emphasis, and are frequently involved in classified work, there is still a great deal of coordination possible and carried on. During the first years of the Unit's existence, the PRL provided the machine accounting personnel and equipment which allowed the Unit to accomplish its statistical analyses. Since the Unit has procured some of its own EAM gear, it no longer depends on the Personnel Laboratory, but that Laboratory continues to share its special statistical competence, including its computer sophistication.

The District Public Works Center provides the Unit with important housekeeping support. The Naval Training Center provides the Unit with housing for enlisted men. The U. S. Naval Hospital provides the Unit with space and support for its psychophysiological and clinical programs.

enlisted men.

The principal non-local liaison, on the research level, has been with the Medical School and Center for the Health Sciences of the University of California at Los Angeles. The Unit's consultants on neurological research, clinical research, biomedical statistics are all professors in the university.

Research efforts of the Unit are subsumed under one Naval Research Requirement and one Exploratory Develoment area. The Naval Research Requirement is Naval Medical and Dental Problems, under which there is a specific requirement for basic research related to psychiatric and psychological problems connected with small groups working in relative isolation and with personnel selection.

Under exploratory development tasks there is, in Life Sciences Technology, a general requirement for the development of information leading to the improvement of medical and psychophysiological standards upon which to base selection and training of Navy and Marine Corps personnel. The first exploratory development requirement under Life Sciences Technology relates to Human Effectiveness. The requirement includes "studies and development of biological and behavioral information for the establishment of criteria in the selection and training of personnel, personnel reliability and performance, physical and mental fitness, and motivation and morale.

"There is a requirement to study the causes of, and human response to, motivation and the methods for the enhancement of morale through biological, pharmaceutical, and psychophysiological techniques."

Biomedical research in the Navy is aimed at improvement of patient care and is also concerned with long-range protection of sailors and Marines from a variety of hostile environments. Both of these aims are relevant to the Unit's present and planned research, but the latter includes, of course, the more dramatic features of research, with the Unit's five years of study of selection for and appraisal of the men who have been wintering over in the Antarctic since the inception of the International Geophysical Year and with its emphases upon psychophysiological studies of adaptive mechanisms of the body and problems of monitoring human effectiveness and human and reliability under conditions of both physiological and social stress.

The extremes of man-made environments as well as the extremes of climatological and other conditions typical of current operations in remote areas of the world are of concern in the planning of the Unit's research programs.

Preventive Psychiatry

Preventive psychiatry, in the 1960's, includes the professional knowledge, in theory as well as in practice, available for the planning and implementing of programs:

(1) To reduce the incidence of mental disorders, and hopefully other varieties of maladaptive behavior, within the Navy.

(2) To reduce the duration of disorders or behaviors which impair the effectiveness of men in the Navy.

(3) To reduce the severity and the extent of any impairment which may result from such disorders.

In the terminology of Professor Gerald Caplan of Harvard these are primary, secondary, and tertiary preventions.

Much, if not most, of the psychiatric service of the Medical Department of the Navy, can be considered as utilizing principles of preventive psychiatry. The diagnostic and therapeutic services of the Naval Hospitals and of some of the outpatient clinical services are patently involved in secondary prevention. The psychiatric services in the recruit training commands are evidently primary prevention, as are the various screening and referral services involved in the selection of men for unusual environments, such as the

Antarctic, or for billets of unusual rigor or stress, such as underwater demolition.

The initial task allocated to the Unit, shortly after its foundation, was concerned with preventive psychiatry and a division of the Unit has focussed its attention, since 1960, on the study of factors relevant to the successful adjustment of the recruit upon first entering the Navy and upon the identifiable characteristics which might be demonstrably associated with his persistence through a first enlistment or beyond.

There has been for many years a persistently high rate of admissions to Naval Hospitals for psychiatric reasons, and various psychiatric diagnoses, especially the character and behavior disorders, account for the separation from the naval service of several thousand young men each year. Moreover, symptoms suggesting emotional pathology are frequently of note in the behavior and in the disposition of naval offenders. The continuing problem to the Navy and to Naval Medical warrants high priority for work in preventive psychiatry and especially with recruits.

The original experimental design called for a comparison of the validity of three screening methodologies which differed from each other in the extent to which the psychiatric screening units participated in the making of decisions to retain or to discharge recruits. Subsequent service attrition, as one criterion of two-year effectiveness, has been compared for the three screening procedures, but other criteria need be analyzed in order that comparisons can be made which are truly representative of fleet effectiveness. Descriptions of the characteristics of recruit populations and the course of their enlistments in terms of attrition rates, variety of duty assignments, incidence of various illnesses, etc., are also in need of compilation.

Presently, research efforts are being pursued in the area of prediction, and analyses made of the recruit study data in order to ascertain which variables are relevant to the discharge-retain decisions which clinicians are regularly called upon to make at recruit training commands. In addition to peer ratings and company commander predictions, other measures of recruit training performance, as well as demographic and personal history variables, are being scrutinized. Incidentally, it should be noted that this is not an uncomplicated analytical task, but one which requires, in addition to a determination of the predictive validity of a variable, a calculation of the amount of its contribution which is unique in prediction, and a consideration of the practicalities involved in obtaining the data from which the predictor might be derived. In this connection, a procedure has been developed which isolates the linear, non-linear, and interaction variances which are contributed by predictors. This analytical technique provides a method for capitalizing on types of variance which have hitherto not been utilized to their fullest in multiple prediction procedures. The goal of these studies is, of course, to provide reliable probability estimates of enlistees' chances of fleet success which can be used by clinicians at recruit training commands.

Two major developments have taken place during the course of the investigative effort which have resulted in the establishment of goals which were not originally part of the experimental design. The first of these has been the finding that a large proportion of the recruits who are routinely discharged as character and behavior disorders during training might effect a satisfactory adjustment in the fleet if retained in service and graduated from training. At least half of just such a deliberately retained group were found, after completion of their first tours in the Navy, to have been recommended by their line officer superiors for reenlistment. One new goal, therefore, is to determine what demographic and personal history characteristics, if any, can differentiate, from a group of subjects who originally appear shaky in training, those who mature with their experiences in the fleet from those who apparently do not, as determined by recommendations that they not be reenlisted.

Analysis of data on adjustment of sailors during the Antarctic wintering-over year has demonstrated the importance ofthe sort of work a man has, the peers he works with, and the superiors he works under. There can be little doubt that the quality of adjustment of the recruit leaving the recruit training command for his first duty station will be affected by the billet he is assigned to and the nautical environment he finds himself in. Variations in fleet assignment may very well be relevant to predicting effectiveness of the individual sailor. By conceptualizing the predictive validity of screening techniques and the risk categories derived therefrom as being altered by enlistees' assignments after recruit training, it is possible that unique predictive variance may be discovered. In its broadest sense, the preventive psychiatry research program is conceptualized as dealing with Navy and Marine Corps personnel in general service environments outside the hospital setting.

The continuing need for this research program is justified by the high incidence of psychiatric admissions to medical installations, the large percentage of personnel who regularly require service separation because of psychiatric disorders, and the occurrence of large numbers of disciplinary offenses which are so frequently symptomatic of emotional disease.

The predictive validity of the initial clinical examination has already been studied and data have been collected to test the validity of peer nominations and company commander ratings.

During recruit training many enlistees need encouragement and support. Recruit data already analyzed suggest that benefits could be derived from an exploratory recruit training program of supportive guidance, monitored by an appropriate research effort. Naturally, such a program would require considerable modification of existing recruit screening practices, and no plans for such an undertaking have as yet been discussed or proposed.

By fiscal year, the principal studies envisioned under the general rubric of preventive psychiatry are:

1965-1966: Translation of dependable demographic and test data predictive of fleet adjustment to the use of recruit training officers, and, possibly, of recruiting officers. Continued studies of the validity of specific informations as relevant to adjustment during a first enlistment. Illness in the Navy: is it predictable from information collected before enlistment or during recruit training? Peer nominations: Validity as predictors and as criteria of recruit adaptation. Feasibility in military assessment.

1966-1967: **The psychiatric interview in the recruit evaluation units of recruit training commands--focussed studies.**

The reliability and validity of company commander and drill instructor estimates of recruit effectiveness and their optimal use in psychiatric assessment.

Ego strengths of initially maladapting recruits.

Predictive studies of naval offenders.

1967-1968: **The self-description inventory in recruit assessment--revision and revalidation, with development of differential criterion scores.**

Incidence and significance of character and behavior disorders among recruits in training.

The assessment of the recruit who performs well in recruit training, but fails in advanced training or in the fleet.

1968-1969: **The significance of transition stages in recruit training:**

- **(a) the transition from civilian to recruit**
- **(b) the transition from recruit training command to school**
- **(c) the transition from recruit training command to fleet**

Adjustment hazards in these transitions.

1969-1970: The relationship of physical fitness to mental health during recruit training--Marine Corps and Navy

Physical fitness at the end of recruit training and its relationship to adjustment in the post-recruit year.

Manning and funding minima for these studies are summarized in a table for all Unit studies.

Psychophysiology and Neurology

The goals of the Psychophysiology Division of the Research Unit have been formulated and the programs carried out to provide the Medical Department of the Navy with research capability for the study of the psychophysiological aspects of human reactions to stress with special emphases upon naval environments. The Division's studies are also designed to complement the studies in social and preventive psychiatry, of epidemiology, and of special stressful environments done in the other divisions of the laboratory.

The proposed long-range program of the Division, submitted to the appropriate code in 1960 delineated four areas of interest and competence:

1. The relation of EEG and psychophysiological variables to each other and to performance during various levels of arousal.
2. The study of cortical and autonomic adaptation and lability in clinical and non-clinical populations and the differential effect of appropriate drugs on cortical and autonomic adaptation.
3. The interaction of the central nervous system and the autonomic nervous system with particular attention to the changes in cortical activity.

4. The relation of cortical, autonomic, perceptual, motor, and cognitive activity in clinical and non-clinical subjects in routine situations to stress situations.

In 1965 the purpose of the Psychophysiology Division remains the same with the exception of research in the area of psychopharmacology. At this time, no research in this area is planned. Moreover, other Naval medical laboratories are better equipped and staffed for such research. The four specific areas of research listed in 1960 are also still appropriate, with exception again of Number 2, concerned with the effects of drugs on cortical and autonomic adaptation. With reference to the second area, it is of interest that Albert Ax, at Detroit Lafayette Clinic under NASA contract, has a large scale program of study of autonomic adaptation in clinical and non-clinical groups. He has labeled the ability of subjects to show autonomic adaptation to novel stimuli and sutonomic conditioning as indications of "physiological learning aptitude." Ar. Ax believes this "PLA" may be of use in selecting personnel for duty requiring adaptation to prolonged stress.

During the five-year tenure of this Division, research has been oriented around area Number 3, concerned with the interactions of and changes in the central nervous system (CNS) and autonomic nervous system (ANS) as a result of changes in cortical activity. This research was supported under Bureau of Medicine Research Work Unit MR005. 12-2304 entitled "Perceptual, motor, cognitive, and autonomic functioning during abnormal EEG activity."

The research effort under this Work Unit is gradually tapering off with only one study now underway. This research is concerned with the autonomic correlates of spike wave complexes during all night sleep. This study should be completed by January 1966.

Study of epileptic patients, however, is continuing with the study of the "single-seizure patient" under Bureau of Medicine Research Work Unit MR005-12-2304, Subtask No. 2. The title of this study is "Incidence, diagnosis, and prognosis of patients admitted to San Diego Naval Hospital with DU Epilepsy." The research plans for this study include a three-year follow-up of each patient. During the first year of data collection, 29 patients met the criteria for admission into the study. It is anticipated that two more years (1967) will be required to reach the desired number of 75 patients, with the required follow up studies continuing into 1970.

While the single-seizure study will be a major area of effort for the next two years, other research will be initiated. One goal of this laboratory has been the achievement of a balance of applied and basic research, and where possible, to use the same subjects for both. Under the first task, helicopter pilots, used as subjects in the photic stimulation study, providing basic data on the EEG and autonomic changes induced by flicker, also contributed information on flicker as a pilot problem and contributed to answering a question about the usefulness photic stimulation as a possible screening procedure for helicopter pilots.

In the single-seizure study, each patient is examined during a four-hour sleep record after sleep deprivation. These data are useful not only for determination of the incidence of seizure activity produced by these procedures, but also for study of autonomic activity during sleep and after sleep deprivation.

The findings from these patients have resulted in an extension of sleep research, reflecting the laboratory's continuing interest in the relationship of cortical and autonomic functioning as well as in performance during various levels of arousal. Research is concerned at present with basal autonomic activity and autonomic response patterns in the awake and sleeping subject. While there is growing interest in the area of sleep and autonomic activity during sleep, findings are conflicting and a multivariate study has not been reported to date. There are no published reports on intra-subject comparisons of autonomic activity in the awake and sleeping subject. Research in this laboratory and that by Evarts and his staff at NIMH, Bethesda, suggest that the neurophysiology and psychophysiology of the sleeping subject may differ in kind rather than in degree from that of the awake subject.

Over a period of approximately three years the specific goals of this research will be:

1. To investigate further spontaneous autonomic responses during various stages of sleep and the relation of waking to sleeping spontaneous activity.

2. To investigate:

a. Specific* autonomic responses during the various stages of sleeping and waking.

b. The relation of specific activity during waking to specific activity during sleeping.

c. Autonomic response patterns to auditory, visual and neutral stimuli.

d. Autonomic response patterns to meaningful and to neutral stimuli.

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*Specific responses are responses to defined external stimuli.

e. The spontaneous-specific correlation during waking and sleeping.

f. Homeostatic relations between autonomic base levels and autonomic response patterns.

An area of increasing interest to both sleep researchers and those concerned with performance after periods of stress requiring prolonged wakefulness or only brief periods of sleep, is the restorative or recuperative effect of the various stages of sleep. Much has been written on the importance of I-REM, the active dreaming stage of sleep, and the effects of dream deprivation. After prolonged REM deprivation it has been reported that the subject becomes "disturbed" and that the percentage of total sleep time spent in REM sleep increases for the first two or three recovery sleep nights when the subject is allowed to sleep undisturbed. Recent studies have also indicated that if a subject is deprived of slow-wave sleep (stages 3 and 4) there also is an increase in the percentage of time spent in slow-wave sleep on the first recovery night. Some sleep researchers now feel slow-wave sleep may be more important to the organism's well being and has more recuperative power than REM sleep. To date there are no definitive studies attacking this problem of the relative recuperative power of the various stages of sleep. Will a subject after 72 hours without any sleep, who is prevented from having REM sleep on the first recovery night of sleep, be able to perform as effectively as a similarly deprived subject who is allowed REM sleep but denied slow-wave sleep on the first recovery night? Will a subject who is chronically deprived of REM sleep differ in behavior and in his ability to perform various tasks from a subject who is chronically deprived of slow-wave sleep? Will time of day be a factor in the results obtained? To examine these questions, a study is planned which will begin within the next 18-24 months. It is anticipated that this study will require a greater commitment of laboratory time, personnel and equipment than is now available. Discussions with other sleep researchers have aroused their interest in the recuperative power of sleep stages and a collaborative or a coordinated research program may be the most effective way of attacking this problem.

While studies have been completed concerned with EEG and autonomic activity in clinical and nonclinical subjects under routine conditions, major work has not been done on sleep deprivation under stress conditions. Results from one subject after 264 hours of sleep deprivation and one Underwater Demolition Training subject after "motivation week" indicate that there are changes in the CNS, ANS, perceptual, motor, and cognitive areas.after sustained stress. As part of Project SEALAB II, the laboratory plans to gather data on EEG and psychophysiological changes after a sustained stress situation, initially by obtaining baseline data on the first SEALAB crew before submergence and the examining each crew member again upon completion of the dive. In addition to possible research significance, these data will give useful physiological data enabling the medical staff to evaluate the effect of this prolonged artificial environment on critical CNS and ANS functions. The findings from this first crew will determine the Division's further participation in Project SEALAB.

Acquisition of a capability to record data on FM tape has increased interest in the use of computers to assist in data analysis. Most of the work to date has been concerned with computer analysis of EEG data. By use of appropriate resolution intervals in computing the autospectra of EEG data, the autospectra effectively differentiates the various stages of sleep. One of our goals is to utilize the data obtained from the digital computer to build an on-line filter scoring system for stages of sleep. If the digital computer indicates that certain frequencies and amplitude peaks are characteristic for certain stages of sleep, then by appropriate filtering and triggering circuits, an on-line objective analysis of the EEG during sleep can be accomplished. The use of computers, thus, is not only an aid in analysis of

EEG changes not detectable by visual analysis, but also a tool to provide more efficient and less costly on-line data reduction procedures. The computer can initially tell us what are the important parameters; then electronic circuits can be developed to detect these critical parameters in the laboratory.

There are perhaps only three or four laboratories in the world with capability of studying sleep, fatigue, recovery from fatigue through sleep, drowsiness and associated states in a comprehensive psychophysiological manner, including the autonomic features. The laboratory's recent cooperation with the underwater demolition training activity at Coronado, in which the trainees most fatigued at the end of "Hell Week" were studied neurologically, has provided an unusual opportunity to study in vivo the physical and psychophysiological effects of sleep deprivation in especially fit young men. Study of the motivation of UDT men proceeds concomittantly with the physiological studies.

The fact that the laboratory possesses only one dynagraph and is equipped to study only one patient at a time on its psychophysiological recording has resulted in the psychophysiological study of only one trainee from a class.

The Navy at the present time has a number of hazardous jobs where physical exhaustion, debilitating environment, and danger combine to bring out the possibility of degradation of performance, including the actual combat in southeast Asia, where insurgency and counter-insurgency demands are paramount, and shipboard tasks, such as those on carriers.

The psychophysiological studies of this laboratory, while aimed at providing normative, base-line data on functioning of healthy young men, are also directly relevant in the study of such pervasive naval medical problems as vigilance and its loss, fatigue and its effects on performance, reliability of performance, and the evential possible monitoring of these states through psychophysiological means--and eventual medical control through timely and appropriate intervention.

By fiscal year, the principal studies planned under the Division of Psychophysiology and Neurology are:

1965-1966: Diagnostic criteria of the single episode of loss of consciousness, completion of initial testing and case work-ups.

The psychophysiological cost of severe effort in UDT trainees.

1966-1967: Single-seizure: follow-up testing.

Spontaneous autonomic activity in working and sleeping states.

Technical problems in on-line analysis of psychophysiological functioning.

Recuperative effects of sleep stages: pilot studies.

Physical effort--psychophysiological cost.

1967-1968: Single-seizure: follow-up testing.

Autonomic response patterns to exteroceptive stimuli and to meaningful and neutral stimuli.

Recuperative effects of depth of sleep: studies of selected populations from special environments.

1968-1969: Single-seizure: final follow-up testing.

Recuperative effects of sleep: field studies.

Autonomic response patterns and monitored performance.

Computer analyses of psychophysiological data.

1969-1970: Single-seizure: analyses and report.

Recuperative effects of sleep: cycles and performance.

The psychophysiological and neurological cost of extreme effort.

Funding and manning requirements are summarized in a table for all Unit research.

Special Environments

In 1961 the Special Environments Division was assigned a research task in the area of psychiatric selection and evaluation of personnel effectiveness in special environments. The methodologies developed during the past four years and the criterion analyses demonstrated to be feasible and valid should be applied to a variety of naval environments and situations to which men are currently being assigned. Selection for exotic, hazardous, or special environments continues to be a prime research goal of the Unit. Under this work area the Unit envisions:

1. Development of a rationale and appropriate instruments for selection of personnel for a variety of specialized assignments.

2. Selection for Antarctic duty.

a. Supervisor and peer criterion data will continue to be collected from small stations on a routine basis.

b. Test and clinical evaluation data for Deep Freeze 1963-1965 will continue to be analyzed.

c. Unanalyzed sociometric and questionnaire data for Deep Freeze 1962-1964 will be evaluated and similar data currently being collected in the Antarctic will be analyzed.

d. An experiment evaluating the effects of special training for Deep Freeze examiners will be analyzed during Fiscal Year 1966.

2. Selection for UDT Training.

a. Biographical, attitude, and symptom questionnaires will be administered to candidates for UDT training, and relationships of test data to attrition from the UDT program will be evaluated.

b. In a later phase of this project it is planned that sociometric data will be collected from boat crews prior to "Hell Week," and these data will be related to test and criterion data.

c. UDT candidates will be compared on demographic and personality characteristics with other groups of volunteers for hazardous duty as well as with Navy personnel in general.

3. Selection for Undersea Environments.

a. It is anticipated that the Special Environments Division will participate in certain aspects of the SEALAB program (psychiatric evaluations of volunteers and measurement of performance) as significant numbers of personnel become involved in the project.

The identification of the circumstances under which the need for treatment of psychiatric conditions occurs is a fruitful area in which to search for clues upon which to generate hypotheses relating to preventive psychiatry. One such general hypothesis is that certain combinations of personality, character, and demographic traits in individuals who are placed in certain duty assignments are more highly associated with the onset of psychiatric symptoms than are other combinations. It is considered that the current most powerful model with which to obtain such clues and test such hypotheses is an epidemiological approach.

To use such an approach effectively requires first of all that the population to be sampled must be carefully defined and that the criteria to be applied be specified in such a way as to permit objective and meaningful measurement. Application of such a model in the context of neuropsychiatric research aimed at fostering the concept of preventive psychiatry in the naval service would then first require priority assignment to populations to be studied and the criteria to be used.

The form of such a priority listing depends on what assumptions are used in its creation. This forecast uses two assumptions: (1) The naval forces of the future will more and more be organized to fulfill special combat functions; (2) The higher the probability that personnel will come into direct contact with an enemy of the United

States, the more serious the presence of psychiatric symptoms is considered to be.

Using those assumptions naval personnel can be grouped into two general classes, "combat" and "support." The class "combat" may be further divided into four sub-groups: surface fleet, submarine warfare (including ASW), the flying Navy and Marine Corps, and ground troops. The latter sub-group consists of the Fleet Marine Forces, the CBs and UDT personnel. The class "support" includes all other naval personnel.

Utilizing an epidemiological approach, the four sub-groups of the "combat" would first be canvassed to obtain data relative to the incidence and nature of psychiatric symptoms in those populations, together with pertinent demographic information. The criteria against which such data would be compared would be generally the effectiveness with which personnel carried out their assigned duties. That is to say, the presence of psychiatric incapacity would be measured by how well a member carried out his duty assignments and not on the nature and degree of psychopathology present. Specific work will involve.

1. Psychiatric Census

a. Analyses will be conducted of "F" Card data for all cases of mental illness in the Navy and Marine Corps during the calendar years 1960, 1961, and 1962 ($N \cong 24,000$ cases). Separate bivariate distributions ($v = 13$) will be obtained for the following sub-populations by year: (1) Navy male enlisted, (2) Navy male officers, (3) all Navy males, (4) Navy female enlisted, (5) Navy female officers, (6) all Navy females, (7) all Navy officer candidates, aviation cadets, and midshipmen, (8) total Navy, (9) Marine male enlisted, (10) Marine male officers, (11) all Marine males, (12) Marine female enlisted, (13) Marine female officers, (14) all Marine females, and (15) total Marine Corps. The above series of analyses will produce 3,510 tables for study. Distributions will be compared over years and over populations.

b. Further analyses will be made of census data for all cases of mental illness during calendar years 1964 and 1965 as data and research personnel become available.

c. Field surveys of the incidence and prevalence of undiagnosed mental illness will be initiated as funds and personnel become available.

2. Hospital Psychiatry

a. Variations in Navy hospital in-patient populations, differences in diagnostic disposition policies, consistencies in diagnoses between non-psychiatric and psychiatric activities and between one psychiatric facility and another will be investigated.

b. Factors affecting change in diagnosis from admission to discharge and factors predicting final diagnosis and disposition will be studied.

c. Factors affecting the reliability and validity of hospital diagnoses will be investigated.

d. Relationships of background characteristics, military history, presenting symptoms, and in-hospital behavior to diagnosis, treatment, and disposition will be determined.

e. Comparisons of hospitalized psychiatric populations with other naval populations will be carried out.

3. Outpatient Psychiatry

a. Research studies similar to those outlined for hospital psychiatry will be carried out for the outpatient population as well.

4. Mental Patients Returned to Duty.

a. All patients returned to duty from major naval hospitals during calendar year 1965 will be followed up and types of attrition, re-hospitalization, and performance records will be determined after one year on duty. Follow-up samples will be accumulated month by month during calendar year 1966.

b. An experimental group will receive follow-up interviews approximately six months after release from a major naval hospital while a control group released during the same period will not receive follow-up interviews. Differences in attrition, re-hospitalization, and performance between experimental and control groups will be determined and detailed data on adjustment problems of the experimental group will be gathered in the interview.

5. Automated Psychiatric Data Systems

a. Computer systems for a continuous Navy-wide psychiatric census will be developed.

b. Computer systems for rapid assembly and display of current patient data will be developed.

A third work area is concerned with Characteristics of the Naval Population.

1. Basic data concerning the personal, social, and occupational characteristics of the Navy population would be assembled and inter-related.

2. Demographic and cultural variations among naval subpopulations.

a. Biographic data available from several thousand Deep Freeze volunteers, representing many Navy specialties, will be utilized for comparative studies on a wide-range of familial, social background, occupational, and avocational interest variables. Preliminary results have indicated important background differences among Navy occupations including a stratification of Navy occupations on family socioeconomic status.

b. Relevant data from the Bureau of Naval Personnel and recruit studies will be referred to for comparative purposes.

3. Attitude, personality, and value differences among occupational groups.

a. A number of standard test scales and special inventories will be utilized to measure significant variations upon Navy occupations and to compare Navy groups with others. Relationships of test variables to age, cultural background, education, and other life status variables will be established. How Navy men describe their own personalities and how they are described by others, including clinical experts, will be determined for occupational subgroups. Analyses now in progress will be continued and extended.

4. Navy environments and organization.

a. Differences among naval assignments and performance characteristics associated with various assignments will be studied.

Speed of advancement in rate and performance evaluations have been found to vary with occupational assignment. Relationships of work conditions and work performance to the incidence of emotional disorders in various Navy sub-populations with demographic and personality variables controlled will be examined.

b. The size and structure of operating units has important implications for leadership practices and interpersonal adjustment. Selected operating units representing a variety of naval assignments and environments will be studied intensively as availability of funds and personnel permits.

5. The knowledge of social and cultural differences developed in studies of the naval population and organization would be communicated to psychologists, psychiatrists, and others concerned with recognizing deviations from social-cultural norms in the naval service.

The fourth principal area of work is Experimental Psychiatry.

1. Etiology of mental illness

a. Family background and other case history information will be analyzed for inpatient and outpatient populations in an effort to reveal developmental patterns as they relate to kinds of mental illness. Variations in personality patterns or syndromes within diagnostic groups will be studied.

b. The recent histories of patients' adjustment problems will be analyzed in an effort to identify situational factors in mental illnesses. Differential admission rates for various Navy environments and assignments may suggest precipitating factors in emotional illnesses which can be investigated more intensively in field units.

2. Diagnostic procedures.

a. Utilization of case history information, previous diagnostic evaluations, behavior observations, and reports of ward behavior in the determination of the final diagnosis will be studied. Adherence to the standard psychiatric nomenclature and the presence or absence of common definitions of behavior traits and symptoms will be related to the reliability of diagnostic classification. Possibilities for strengthening the current classification system and relating it to new methods of behavior classification will be explored.

3. Treatment methods

a. Uniformity in methods of case handling, behavior management, and specific treatment procedures will be studied for inpatient populations. The conditions and consistency of drug usage will be studied for the various diagnostic groups, and the relationships of visiting privileges, liberty, work assignments, and other ward management procedures to final diagnosis and disposition will be evaluated. Analysis and clarification of case handling procedures would make possible the design of experimental studies to evaluate the effects of variations in treatment procedures upon final disposition and adjustment after return to duty.

b. Roles played by hospital corpsmen, medical officers, nurses, and other key personnel will be studied in an effort to determine their impact upon diagnosis, treatment, and disposition.

The published research reports, especially those by Dr. Eric Gunderson and by Lieutenant Paul D. Nelson, MSC, USN have documented the importance of understanding the social environment of the sailor in the identification and assessment of his capabilities to carry on his duties. This is almost a truism, but the specific pay-off in Antarctic selection, showing how Seabee, cook, radioman, technician, medical officer's job affects performance and even selection for the job, is noteworthy. Extension of this approach to naval environments of even greater importance than Antarctica is considered worthy and timely. The motivation of the sailor is complex but certainly includes the importance of the Navy; the challenge of his job; his own personal adjustment including his aspiration level and his worries; and the structure of the face-to-face group he works with.

Psychiatric census: Navy-wide trends.

Hospital psychiatry: the returned-to-duty patient.

Outpatient psychiatry: Billet, age, and mental health.

Study of factors relevant to human reliability.

The Naval population: fitness, morale, occupation.

1968-1969: Psychiatric census: development of a computerized system.

The Naval population: billet, culture, background
the characteristics of the volunteer

Hospital psychiatry: terminal vs. non-terminal diagnoses

Outpatient psychiatry: case-finding and short-term therapy effects.

Experimental Psychiatry: situational factors in maladaptive behavior.

1969-1970: Psychiatric census: validation of a computerized system.

The Naval population: special groups.

Hospital psychiatry: some implications from an epidemiological approach.

Outpatient psychiatry: Psychiatric service to special forces.

By fiscal year, the principal studies planned under the Division of Special Environments are:

1965-1966: Criterion analysis for unusual military environments--methodology.

The Antarctic: studies of peer evaluations.

The Antarctic: clinical evaluation data.

Special training of clinical examiners for Deep Freeze.

Underwater Demolition trainees: demographic factors in predicting attrition.

Psychiatric census: Analyses of calendar years 1960-1962.

The fate of the returned-to-duty patient: pilot studies.

Outpatient psychiatry: survey of populations served.

1966-1967: Deep Freeze: Final criterion data analyses UDT: sociometric studies.

. Physical fitness and attrition.

Psychiatric census: analyses of calendar years 1963-1965.

Hospital psychiatry: diagnoses and disposition.

Outpatient psychiatry: symptomatology and disposition.

1967-1968: Deep Freeze: Report and general implications

UDT: Comparisons of these with other Navy special groups.

Experimental Psychiatry: Treatment methods in Naval Hospitals.

The funding and manning requirements of these programs and of those detailed above for neurology, psychophysiology and preventive psychiatry are indicated in the summary table.

The variety of naval populations studied by the research teams of this laboratory during the past five years is illustrative of the pervasive nature of research into the adjustment problems and of the paramount importance of the work of the Bureau of Medicine and Surgery.

- Patients:
  - In hospital:
    - Epileptics
    - Heart patients
    - Closed ward NP patients
    - Medical patients
    - neurological patients
  - Outpatients:
    - At San Diego
    - Bremerton
    - Treasure Island
    - Pearl Harbor
  - Non-patients:
    - Recruits:
      - Navy -
        - At Great Lakes, and San Diego
      - Marines -
        - At San Diego, and Parris Island
    - Post-recruits:
      - Hospital Corps students
      - Helicopter pilots
      - Seabees

Fleet:

UDT trainees
Fleet Marine Force
Carrier personnel
Cruiser personnel

The variety of studies and approaches have demonstrable relevance to medical problems in the Navy, particularly to recruit psychiatry, field psychiatry, and hospital psychiatry and neurology. Beyond the immediate medical problems, these research approaches have promise of increasing useful information in the areas of vigilance, reliability of performance, adjustment of men and groups of men under stress for extended periods of time, as in the Antarctic, in deep submergence programs, or isolated from other men or groups of men.

It should be noted that midway in the period of the present program projection the medical center of the University of California at San Diego will begin its fulltime teaching of medical students. This major university center with its research emphasis and its location near the heart of the Navy's San Diego complex should enormously increase the scientific and medical back-up of this naval medical laboratory. Conversations about possible modes of cooperation are only informal and exploratory at the present time and the Unit's chief dependence, for high level biomedical and neurological consultation, remains at the Center for the Health Sciences, University of California at Los Angeles.

U.S. Navy Medical Neuropsychiatric Research Unit, San Diego, Calif. Program Projection - 1966-1970

	2004.1 Deep Freeze		2004.2 Epidemiology		2304.1 Autonomic		2304.2 Epilepsy		2201 Recruit		TOTAL	
Fiscal Year	Funds	Prof. Man-Yrs.	Funds	Prof. Man-Yrs.	Funds	Prof. Man-Yrs.	Funds	Prof. Man-Yrs.	Funds	Prof. Man-Yrs.	Funds	Prof. Man-Yrs.
1964	61	2.45	0	--	65	4.7	7	0.8	101	3.2	227	7.55
1965	50	1.80	23	1.25	51	3.6	32	2.2	119	3.3	275	12.15
1966	54	2.0	44	3.5	62	3.5	42	2.5	121	3.7	323	15.2
1967	61	3.0	78	4.5	90	3.5	54	3.0	142	4.0	425	18.0
1968	65	3.0	85	5.5	90	3.0	55	2.5	150	4.0	445	18.0
1969	75	3.0	85	5.5	110	4.0	35	1.5	170	4.0	475	18.0
1970	75	3.0	95	6.0	145	5.5	35	1.5	150	4.5	500	19.0

NOTE: Professional Man-Years are defined to include GS-9 and above.